

Transport and Environment in Sub-Saharan Africa

Key Findings

- **Urban air pollution is on the rise in sub-Saharan Africa, and a major cause is the use of fossil fuels in transport. However, vehicle emission standards are inadequate and poorly enforced, and only eight countries in the region have operational routine air quality monitoring systems.**
- **Deaths and injuries from road crashes are taking a serious toll, especially on pedestrians and cyclists. Africa has less than 3% of the world’s motor vehicles, but more than 11% of global road fatalities. There is a need to increase awareness of this problem amongst politicians, planners, engineers and the public.**
- **Traffic congestion is of growing concern in many cities. The causes include ineffective public transport; lack of transport demand measures; poor quality of cycling and walking infrastructure; lack of integrated land-use policies, and poor road discipline. However, the extent of the congestion problem and the resulting economic, social and environmental impacts are rarely quantified or assessed.**
- **Transport policies in sub-Saharan African tend to favour automobiles, which short-changes poor and vulnerable populations. There is a need for policies that ensure a more equitable appropriation of space, from the standpoint of accessibility, safety and environmental protection.**
- **Africa has the lowest historical greenhouse gas (GHG) emissions of any continent, but its emissions are also now growing rapidly, driven by a sharp increase in fossil-fuel use. An integrated approach that incorporates climate considerations in transport planning could reduce transport-related GHG emissions and also increase the resilience of transport infrastructure and systems.**

Introduction

Modern transport is an essential ingredient for development, allowing the movement of labour, supplies and goods, and enabling citizens to access key resources and services. Yet in sub-Saharan Africa, transport is also problematic in many ways, especially in cities. Vehicle emissions are a major source of air pollution; traffic congestion is severe; road-crash deaths and injuries are far too common, and access to transport is uneven, often leaving the poor, elderly, disabled and women behind.

This policy brief, based on a report by the Transport and Environment Science Technology Network (TEST), offers an introduction to transport and environment issues in sub-Saharan Africa, with a focus on air pollution, road safety, traffic flow management, equity and climate change. It also identifies best practices and makes policy recommendations.

Urban air pollution in sub-Saharan Africa

Urban air pollution is on the rise, due to rapid economic and population growth and an increase in motorization. It is now estimated to cause roughly 49,000 deaths per year in the region. One main cause of this pollution is the use of fossil fuels in transport, combined with a lack of emission controls on vehicles, and poor monitoring and enforcement systems. Along with harming human health, pollution from vehicles has a wide range of direct and indirect effects on ecosystems, agriculture and materials. Thus, there is an urgent need to better monitor and manage urban air quality and identify the most effective measures to reduce pollution.

Policies: Most of the 27 countries investigated in the region have adopted Environment Protection Acts, and often they specify vehicle fuel parameters, emission standards and air quality



Traffic in Nairobi, Kenya poses a threat to human health. A motorcyclist follows behind a water truck pouring out black smoke from its exhaust.

standards. Sixteen have set fuel specifications for gasoline and 14 for diesel. No country in the region has diesel sulphur content under 50 parts per million, and several have sulphur content between 2,000 and 5,000 ppm, or even above 5,000 ppm. Only five have promulgated emission standards for vehicles, and only eight have set air quality standards (another two have proposed them). A substantial improvement has been the phase-out of lead, which started in 2003 and has now been essentially completed across the region.

Air quality monitoring: Air pollutant concentration monitoring is used to test compliance with air quality standards. Only eight countries have operational routine monitoring systems: Botswana, Ethiopia, Ghana, Madagascar, South Africa, Tanzania, Zambia and Zimbabwe. Air quality management can be considered comprehensive only in South Africa, and advancing in Ghana; it is at an intermediate stage in Botswana, Madagascar, Zambia and Zimbabwe, and either at an initial or early stage or entirely absent in the other countries.

Impacts: Information on the health, environmental and economic impacts of air pollution is very limited. A few countries have performed studies on health impacts, and two have estimated the costs of air pollution. The paucity of studies is partly due to the lack of air quality monitoring, but also to insufficient institutional capability and a lack of national health surveillance systems.

Challenges for air quality management

Health and a sound environment are often laid out as basic human rights in the Constitutions of African countries, so governments have a responsibility to improve air quality. Initial building blocks would include monitoring; analysis of the resulting data; identification of sources and their relative contribution; action planning (including economic analysis), and implementation. There are several possible management approaches – command and control, application of economic instruments, co-regulation and stakeholder voluntary initiatives, and self-regulation. Awareness-raising and the provision of information to the public are also crucial.

Yet the sub-Saharan countries face several challenges in this regard. They have many old vehicles without emissions control, poor vehicle maintenance, and a lack of cleaner fuels; their regulatory frameworks specific to vehicle emissions are often inadequate, they don't have appropriate monitoring equipment, and existing laws and regulations are poorly enforced. There is also limited funding available, as well as a lack of knowledge, technical capacity, or effective planning. Responsibilities are often shared by several ministries. Thus, most countries address air quality monitoring in an ad hoc fashion, and have poor public awareness and stakeholder participation.

Few countries have emission inventories, and there is only limited or no outdoor air quality monitoring in the cities. Lacking quality-assured emission data or experience attributing emissions to specific sources, most countries can't develop air quality plans to guide policy.

Road safety in sub-Saharan Africa

Deaths, injuries, disabilities, suffering and distress associated with road crashes are a major public health and quality-of-life problem, and they occur at disproportionately high rates in low- and middle-income countries such as those in sub-Saharan Africa. Africa has less than 3% of the world's motor vehicles, but more than 11% of global road fatalities.

Yet road crashes are predictable and can be prevented; fatalities in sub-Saharan Africa could be dramatically reduced.



Kampala, Uganda - road safety issues are a major concern across sub-Saharan Africa. In this picture the adult motorcyclist wears a helmet whilst the child does not.

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Challenges for road safety management

In most cities in sub-Saharan Africa, half of the trips are made on foot, and pedestrians and cyclists are those most affected by road crashes. There is a need to increase awareness amongst politicians, planners, engineers and the public of the importance of addressing the needs of these populations.

Improving road safety in sub-Saharan Africa will require changing mindsets to recognize the importance of high quality, safe pedestrian space and cycling routes. Governments will also need to adjust urban planning; improve public transit; build institutional capacity to address road safety; educate all road users about their mutual responsibilities, and adopt road safety policy measures.

Effective measures to reduce road crash deaths and injuries have been known for many years:

- Reducing the volume of motor vehicle traffic by means of better land use;
- Providing efficient networks where the shortest or quickest routes coincide with the safest routes;
- Encouraging people to switch from higher-risk to lower risk modes of transport;
- Placing restrictions on motor vehicles users, on vehicles or on the road infrastructure.

Sub-Saharan Africa could particularly benefit from measures focusing on land use and traffic reduction; from speed reductions, and from attention to detail in the physical environment in which pedestrians, cyclists and public transport users move around, making safety intrinsic to all aspects of the design process.

They should also prioritize replacing old, poor-quality buses, improving bus regulation and safety checks, and building highly coordinated and integrated bus service networks that ensure passengers' safety as they walk to and from, and wait at, bus stops.

Traffic flow management

Traffic congestion is becoming common in many major urban centres in sub-Saharan Africa as the number and use of motor vehicles increase. Traffic congestion impedes economic development and has a number of social and environmental impacts. Traffic flow management is a set of strategic practices used by transport authorities to ensure uniform vehicle flow, avoid delays due to congestion, and improve safety.

The causes of urban traffic congestion in sub-Saharan Africa include ineffective public transport; lack of transport demand measures; poor quality of cycling and walking infrastructure; lack of integrated land-use policies, and poor road discipline. However, the extent of the problem and the resulting economic, social and environmental impacts are rarely quantified or assessed.

Challenges in traffic flow management

The first challenge is to make city authorities aware of the importance of efficient, affordable mass transit and non-motorized transport as a means of ensuring traffic flow and economic growth. Second, it is necessary to provide governments with knowledge of how to implement cost-effective models that result in a maximum of environmental, social and economic benefits. An approach that combines measures to avoid, shift and improve traffic flows could make a major impact in sub-Saharan Africa. The countries also have a



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Traffic congestion in Dar es Salaam, Tanzania. Not only a cause of local air pollution, traffic delays are an additional economic burden to countries.

chance to “leapfrog” to modern approaches such as traffic demand management (TDM) and intelligent transport systems (ITS). The goal should be a transport system that provides efficient, convenient and attractive alternatives to the private car – but there will be political, technical and financial barriers to overcome.

Transport and equity

Transport plays an important role in economic and social development. It can be a powerful catalyst to sustainability by providing interconnectivity, learning and development, which are essential to the empowerment of socially marginalized and disadvantaged groups.

Equity in transport involves targeting transport policies to ensure an equitable appropriation of space, from the standpoint of accessibility, safety and environmental protection. It aims to grant all people satisfactory living conditions and opportunities such as access to education and health services, irrespective of their socio-economic status, religion, ethnicity or physical characteristics.

In practice, this means supporting tools that provide affordable transport and special services for economically and socially disadvantaged groups. This is a departure from current planning, which often values mobility over accessibility, and motorized modes over non-motorized modes. Although there may be inherent biases in any trade-off, progress has recently been made in improving the tools for equity, particularly in developed countries.

Equitable transport management in sub-Saharan Africa

Currently the monetary costs of roads, the productivity costs of congestion and the health costs of air pollution and climate change are inequitably spread among motorists and non-motorists alike. Mechanisms are therefore needed to make transportation pricing fair, equitable and economically efficient. Countries will need leadership and investment to achieve this paradigm shift.

Transport inequities currently exist in accessibility, access time, speed, comfort, cost and space appropriation by various categories of people. There are also a variety of tools to measure the effectiveness and impacts of different transport options, and a particular decision may seem equitable when evaluated by one particular tool, but inequitable when using a different tool. For example, current transport evaluation practices tend to exaggerate the ben-

efits of automobile-oriented improvements and undervalue alternatives modes, because they are based on demand (the amount of transport that people can afford) rather than need (the amount of transport that people need to access basic services and activities).

Key issues and case studies

An important factor contributing to poverty in rural areas is low accessibility of key resources and services. The hours spent in collecting water, obtaining fuel, or getting to the school, the clinic, or the market are unproductive – “wasted” time. In many countries growth is stunted because of the costs of transportation and the lack of adequate transport; poor access is the most significant factor restraining agricultural development and limiting poverty alleviation.

The TEST report highlights multiple aspects of inequity, including gender and how a transport intervention may affect men and women differently, and age and disability: reduced mobility and/or lack of access to transport is a serious problem for elderly and disabled people in sub-Saharan Africa; the inability to travel independently can socially exclude the disabled and limit their access to education, employment, health services, social events and leisure pursuits.

The report also describes several initiatives in sub-Saharan Africa that show how a focus on increased accessibility and mobility can integrate equity and development. For example, a programme in Mozambique provided microfinance for rural women to buy bicycles; a “Miracle Health Train” brought critical services to rural South Africa; and motor-bike “ambulances” are providing emergency care and helping women give birth in Zimbabwe. Though the evidence of these initiatives’ impact is still just anecdotal and location-specific, the case studies show how transport measures can help address equity issues.

Transport and climate change

Climate change is a major threat to sustainable development in Africa and the achievement of the Millennium Development Goals. Africa has the lowest historical greenhouse gas (GHG) emissions of any continent, but its emissions are also now growing rapidly, driven by a sharp increase in fossil-fuel use. At the same time, Africa is highly vulnerable to climate change impacts, including more-frequent droughts, floods, and other extreme events, and related reductions in agricultural productivity, threats to food security, and risks of conflict over scarce land and water resources.

In this context, there is a clear value to finding ways to reducing Africa’s GHG emissions while continuing to address development needs. An integrated and participatory approach to transport that incorporates climate concerns can deliver economic and social progress at a much-reduced level of GHG emissions, and also increase the resilience and adaptive capacity of transport systems.

Challenges in reducing transport-related GHG emissions

The vehicle fleet in sub-Saharan Africa is growing, with a high proportion of imported used vehicles. Inspection and maintenance is often absent or insufficient. This means poorly maintained and inefficient vehicles on the roads, increasing not only GHG emissions, but also exhaust emissions which affect urban air quality.

Policy recommendations

Transport policy in sub-Saharan Africa must be embedded in a poverty eradication policy, and policies to address poverty must explicitly seek to improve transport. This policy synergy, if well integrated, provides a huge opportunity to deliver successful outcomes.

Across sub-Saharan Africa, policy-makers may want to prioritize the following goals for transport:

- Maximize access for all social groups, all income levels, men and women, as well as the elderly and disabled, so that all citizens can access basic resources, health care, education, training, jobs and social connections with minimal effort, costs and expenditure of time on the journey.
- Create a safe, secure urban environment, aiming to minimize the risk of death and injury from road crashes, with special attention to vulnerable populations such as pedestrians, cyclists, public-transit users, and the poor.
- Ensure that public health measures deal with the debilitating and costly consequences of air pollution on human health.
- Free urban road space by improving traffic flow conditions in a way that stimulates economic activity and job creation and avoids the generation of new traffic.
- Work to reducing GHG emissions from transport – for example, through the “avoid, shift, improve” strategy.

Countries have limited budgets to address these issues, as well as competing priorities. Their current financing frameworks, however, are often skewed towards supporting road construction and motorization, which will lead to more car-dependent mobility patterns and higher emissions. Climate finance could help support more sustainable transport options, but investments in such projects to date have been limited.

Carbon reduction policy measures

A range of policy options can deliver low-carbon, low-cost transport solutions. They can be categorized within an A-S-I strategy:

- **A = Avoid** travel by reducing the need to travel longer distances.
- **S = Shift** transport demand, when possible, from cars to public transport, walking and cycling, and shift freight from trucks to rail and water.
- **I = Improve** vehicles that use fossil fuels to make them cleaner and more fuel-efficient.

Considerable knowledge exists about transport interventions, initiatives and infrastructure improvements that can contribute to sustainable human development while reducing GHG emissions. While finance will continue to be a challenge, many are lower-cost than, for example, major highway projects as well as bringing co-benefits, including improved quality of life in African cities. Measures such as bus regulation and planning, promoting non-motorized transport, land-use planning and bus rapid transit can help countries avoid the hyper-motorization phase often associated with development.



Traffic congestion in Dar es Salaam. The solution by the Government to this gridlock is the construction of a Bus Rapid Transit System.

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Conclusion

There is a significant need to address urban transport issues in sub-Saharan Africa, to reduce air pollution and related health impacts; reduce road-crash injuries and deaths; alleviate congestion; promote equity, and reduce GHG emissions. While there will be challenges in all aspects of this work – not least, due to limited finance – there are numerous proven approaches that could improve the lives of Africa’s citizens and also support development.

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Stockholm Environment Institute
Kräfricket 2B
106 91 Stockholm
Sweden
+46 8 6747070

sei-international.org

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Twitter: @SEIresearch, @SEIclimate

Contact: Dieter Schwela

dieter.schwela@sei-international.org

Further Information:

SEI Director of Communications
Robert Watt +46 73 707 8589
robert.watt@sei-international.org